APPARATUS FOR TILTING KEYBOARD OF PORTABLE COMPUTER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to portable computers, such as laptop or notebook computers, and more particularly relates to an apparatus for tilting a keyboard of a portable computer, in a manner that a rear end of the keyboard is raised up to a predetermined height automatically according to opening its cover, so that the user can operate keys of the keyboard more conveniently.

2. Discussion of Related Art

Recently, portable computers, such as laptop or notebook computers, have become popular and are in widespread usage in many countries. The increased demand for such computers has been partially due to the compact size of these computers which make them ideal for travel or in applications where work space is limited.

In order to maximize space efficiency and facilitate portability of these laptop and notebook computers, such portable computers have typically a suitcase like construction that includes largely a base having a keyboard, and a cover including a computer screen.

Referring to FIG. **1**, there is shown a conventional portable computer **10**, in a exploded perspective view, comprising a base **17** having data input devices such as a keyboard **13** and touch pads **15** on a top side, and a cover **19** which is pivotally secured for upward and downward movements along a rear side of the base **17** usually by means of some form of hinge mechanism and covers the top side of the base **17** so as to protect key elements thereupon.

The base **17** further comprises a keyboard cage **21**, formed in a predetermined depth on the top side, for receiving the keyboard **13**, a main printed circuit board (PCB) **23** on which a computer's central processing unit (CPU) is mounted, a power supply such as a battery and various storage devices such as a floppy or hard disk are established therein, these electronic components are connected electrically to main PCB **21**.

The cover **19** also further includes an LCD panel **25**, mounted on an inner side thereof, for displaying information inputted from the data input means, and an LCD driving circuit for interconnecting the main PCB **23** of the base **17** and the LCD panel **25** of the cover **17** electrically by means of a conductive cable **27** therein.

Along the rear side portion of the base **17** and the rear end of the cover **19**, a plurality of protruding members **29** are formed opposite to each other for pivotal assembling, including pivotal holes **33**, formed longitudinally, through which pivotal pins **31** are inserted.

In the above configuration, after fitting the protruding members **29** together and positioning the pivotal holes **33** in a straight line, the pivotal pins **31** are inserted therethrough, thus joining the cover to the base **17** pivotally.

Meanwhile, when the portable computer is driving, heat is generated from the CPU and the other various electric components on the PCB **23**, and this heat raises the temperature of the system and deteriorates performance of the electric components mounted within the interior of the base **17**. Accordingly, in general, a cooling fan is established on the top of the CPU so as to radiate forcedly the heat generated therefrom. While it is somewhat effective to radiate the heat from the CPU at the beginning stage, it is no more effective to do so in case that the temperature of the interior of the base **17** increases throughout by the heat generated from the other electric components on the main PCB **23** as operating time passes long. Therefore, it is necessary to radiate the heat from the CPU using the cooling fan, at the same time to radiate continuously the heat from the other electric components on the main PCB **23** by a natural convection system as well.

Meanwhile, it is more convenient to operate keys **13***a* arranged on a keyboard **13** of portable computer **10** when the front end of the keyboard **13** is designed lower than the rear end. But in a conventional portable computer **10**, usually the keyboard **13** is mounted horizontally on the top side of the base **17**, considering the thickness of the computer when the cover **19** is closed onto the top side of the base **17**. Accordingly, due to its fixed horizontal keyboard, it is inconvenient to operate the keys **13***a* on the keyboard **13** and it inflicts the stress on the user's hand and wrist.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide an apparatus for tilting a keyboard of a portable computer, in a manner that a rear end of the keyboard is raised up to a predetermined height by opening its cover, so that the user can operate keys of the keyboard more conveniently.

It is another object of the present invention to provide an apparatus for tilting a keyboard of a portable computer, capable of radiating heat generated from various electric components on a main PCB on a base, during operation of the computer, through a ventilation space formed between a keyboard cage on the top side of the base and a bottom side of the keyboard when opening the cover.

To accomplish the objects of the invention, there is provided a portable computer in accordance with the present invention comprising: a keyboard of which both sides of a front portion are rotably joined by hinge means to a front side of a keyboard cage on a base. A cover is rotatably engaged with the base by hinge means mounted within an interior of a rear side portion of the base to be engaged with at least a protruding member of a cover at least one section is formed on the protruding member, and there is at least one slider moved forwardly and rearwardly in the rectilinear direction according to opening and closing the cover, for moving the rear end of the keyboard upwardly and downwardly.

The keyboard tilting member in accordance with the present invention includes: a guide slot formed within the interior of the rear side portion of the base, where the keyboard tilting member meets the protruding member of the cover, communicating with the keyboard cage, having a protruding opening of a predetermined depth therethrough; a sector gear formed on the circumferential side of the protruding member of the cover; and a slider mounted within the interior of the guide slot to be slidably moved forwardly and rearwardly in the rectilinear direction therein, having a slanted edge of a predetermined incline on the front end thereof and a rack gear on the top side thereof to be engaged with the sector gear on the protruding member of the cover through the protruding opening.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE ATTACHED DRAWINGS

FIG. **1** is an exploded perspective view showing a conventional portable computer including a base with a keyboard and a cover;